

CLAIMS

What is claimed is:

1. A electronic control module, comprising:
a housing having a first aperture, and
5 a substrate disposed within the housing and having a second aperture positioned
adjacent to the first aperture, and including a hydrophobic vent assembly
disposed over the second aperture and adheringly coupled to the
substrate, and adapted to permit egress with respect to the housing of a
gas therethrough.
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2. The module as recited in claim 1, wherein the hydrophobic vent
assembly comprises a fluorinated polymer membrane coupled to a structural screen.
3. The module as recited in claim 3, wherein the fluorinated polymer
15 comprises GORE-TEX®.
4. The module as recited in claim 1, wherein the structural screen is a 180-
mesh copper soldered to the substrate.
- 20 5. The module as recited in claim 1, wherein the hydrophobic vent
assembly comprises a hydrophobic coating disposed over a structural screen, wherein
the structural screen is coupled to the substrate.

6. The module as recited in claim 5, wherein the hydrophobic coating comprises Wacker Semicosil 964®.

7. The module as recited in claim 1, wherein at least one electrical component located on the substrate electrically couples to ground via an electrical pathway extending through the second aperture, the electrical pathway being electrically coupled to the housing.

8. The module as recited in claim 1, wherein the hydrophobic vent assembly is adheringly coupled to the substrate via solder.

9. A vehicle control system, comprising:
a vehicle; and
a vehicle control module coupled to the vehicle and adapted to adjust at least one operating parameter of the vehicle in response to at least one operating condition, the module comprising:
a housing having a first aperture; and
a substrate disposed within the housing and having a second aperture positioned adjacent the first aperture, wherein the substrate comprises a waterproof vent assembly adheringly coupled to the substrate, the assembly being adapted to permit egress with respect to the housing of a gas therethrough.

10. The system as recited in claim 9, wherein the at least one operating
parameter relates to an engine disposed in the vehicle.

11. The system as recited in claim 9, wherein the at least one operating
5 parameter relates to a transmission disposed in the vehicle.

12. The system as recited in claim 9, wherein the waterproof vent assembly
comprises a fluorinated polymer membrane coupled to a structural screen.

10 13. The system as recited in claim 12, wherein the fluorinated polymer
comprises GORE-TEX®.

14. The system as recited in claim 9, wherein the waterproof vent assembly
comprises a hydrophobic conformal coating disposed over a structural screen.

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15. The system as recited in claim 9, wherein the vehicle comprises an
automobile.

16. The system as recited in claim 9, wherein the housing comprises
20 aluminum.

17. The system as recited in claim 9, wherein at least one component located on the substrate is electrically coupled to ground via an electrical pathway extending through the second aperture, the electrical pathway being electrically coupled to the housing.

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18. The system as recited in claim 9, wherein the substrate is adhesively secured to the housing.

19. The system as recited in claim 9, wherein the waterproof assembly is
10 adheringly coupled to the substrate via solder.

20. A method of manufacturing an electronic control module, comprising the acts of:

placing a hydrophobic vent assembly onto a substrate such that the assembly is
15 disposed over an aperture extending through the substrate; and
adheringly coupling the hydrophobic vent assembly adapted to permit passage of
a gas therethrough to the substrate.

21. The method as recited in claim 20, wherein the act of adheringly
20 coupling comprises the act of soldering.

22. The method as recited in claim 21, wherein the act of soldering comprises the act of applying solder and the act of re-flowing the solder.

23. The method as recited in claim 20, wherein the act of placing comprises the act of positioning the vent assembly with respect to the substrate via a pick-and-place machine.

5 24. The method as recited in claim 23, comprising the act of feeding the vent assembly to the pick-and-place machine via a tape reel assembly.

25. The method as recited in claim 23, comprising the act of feeding the vent assembly to the pick-and-place machine via a tray assembly.

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26. The method as recited in claim 20, comprising securing the substrate to the housing.

27. The method as recited in claim 23, comprising the act of electrically
15 coupling at least one component located on the substrate to ground via an electrical pathway.

28. The method as recited in claim 20, comprising securing a fluorinated polymer membrane to a structural screen of the hydrophobic vent assembly.

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29. The method as recited in claim 28, wherein the fluorinated polymer membrane comprises GORE-TEX®.

30. The method as recited in claim 20, comprising coating a structural screen with a hydrophobic conformal coating to form the hydrophobic vent assembly.

31. A system for manufacturing an electronic control module comprising:
5 a pick-and-place device configured to place a hydrophobic vent assembly onto a printed circuit board; and
a feed source adapted to provide a plurality of hydrophobic vent assemblies to the
pick-and place device, wherein each hydrophobic vent assembly is
10 adapted
to permit passage of a gas therethrough.

32. The system as recited in claim 31, wherein the feed source comprises:
a reel; and
15 a tape disposed about the reel, wherein the tape comprise the plurality of hydrophobic vent assemblies disposed thereon.

33. The system as recited in claim 31, wherein each hydrophobic vent assembly comprises a fluorinated polymer membrane.
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34. The system as recited in claim 33, wherein the fluorinated polymer membrane comprises GORE-TEX®.

35. The system as recited in claim 31, wherein each hydrophobic vent assembly comprises a structural screen.

36. The system as recited in claim 31, wherein the feed source comprises a
5 tray.

37. A supply of vent assemblies, comprising:
a reel; and
a tape disposed about the reel and adapted to be received by a pick-and-place
10 machine, wherein the tape comprises a plurality of hydrophobic vent assemblies, each vent assembly being adapted to permit passage of a gas therethrough, and wherein each vent assembly is adapted to adheringly secure to a printed circuit board via solder.

15 38. The system as recited in claim 33, wherein each hydrophobic vent assembly comprises a fluorinated polymer membrane.

39. The system as recited in claim 38, wherein the fluorinated polymer membrane comprises GORE-TEX®.

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40. The system as recited in claim 37, wherein each hydrophobic vent assembly comprises a structural screen.

41. The system as recited in claim 40, wherein the structural screen comprises a 180-mesh copper screen.